

NOTES ON THE EARLY STAGES AND LIFE HISTORY OF IDIOCERUS COGNATUS FIEB., IN NEW JERSEY.

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This species was first observed by us during the summer of 1917 on white poplar (*Populus alba*) growing in a nursery at Irvington, N. J., and the following observations were made during the spring and summer of 1918. . .

The eggs of this species are deposited singly during the middle and last of July in the new growth, terminal twigs usually being selected. Any of the new wood is likely to contain eggs, but they are found most plentiful in the last foot of the twig and more sparingly toward the base and the extreme tip. The place of oviposition is indicated by a somewhat irregular, pear shaped blister or swelling about 1 mm. long and 0.5 mm. wide. In many cases, the cap of the egg projects slightly from the surface of the twig. If the egg has been inserted far enough to hide the cap, the bark around the cap becomes somewhat corky and splits. Each egg is firmly embedded in the bark tissue and not simply inserted in the bark as is the case with the egg of *Idiocerus scurra*. As a rule each egg is placed in a slanting position with its long axis more or less at an angle with the grain of the tissue. Sometimes eggs were found in irregular groups of two or three, but more often singly.

Hatching takes place from the middle to the last of May and the young nymphs can be found on the unfolding tender leaves at the tips of the twigs. The upper leaf surface seems to be preferred, many of them resting close to the midrib at the base of the leaf. Some however can be found on the lower leaf surface. As the nymphs become older, they scatter, many resting on the stems of the new growth usually close to a leaf petiole. On the whole, the upper surfaces of new leaves are preferred. Here they blend with the whitish bloom of the young leaves and only those with distinct blackish markings are readily seen. Moulting takes place on the

¹ The arrangement of the authors' names has no significance.

lower leaf surface as cast skins of various stages are found here and on no other part of the tree.

Each nymphal stage requires from three to six days. The first nymphs appeared May 13 and the first adults on June 12. Practically one month was required for the nymphal stages although cool weather which prevailed from the middle of May throughout June may have prolonged the lengths of the stages. The bulk of the adults appeared during the last of June and the first part of July. By July 12 no fifth stage nymphs could be found and overwintering eggs were being deposited. There is but one generation each year and adults are found in diminishing numbers throughout August and as late as October.

The older nymphs and adults scattered considerably and could be found on the leaves at the tips of the branches all over the infested trees, even at the extreme top. As a rule the majority of adults were found on the twigs. The adults were very active and usually moved readily when disturbed. In common with many other species they moved around the twig to the side away from observer. Even when present in large numbers no appreciable damage to the foliage was observed. Where many nymphs fed on the young leaves, the foliage showed some slight malformation and whitening due to the abstraction of the sap, but the injury was not serious.

As the white poplar is a native of both Europe and Asia and according to Keeler imported into this country very early, it seems evident that *Idiocerus cognatus* was introduced in the egg stage with this tree. In New Jersey, we have found it at Irvington, Asbury (Warren Co.), Princeton Junction, Rutherford and Paterson and it undoubtedly exists on white poplar at many other places. The New Jersey records and those of Mr. Olsen for Long Island, N. Y., indicate that it is well established in the East. A description of the adult and the synonymy is given in Mr. Olsen's paper in this issue and need not be repeated here. For illustrations of the adult and of the male and female genitalia see Mr. Olsen's paper.

Egg.—Length 1.11 mm. Greatest width 0.35 mm. Translucent, elongate, broadest at middle, slightly curved when viewed laterally, broadly rounded at basal end, slightly tapering toward cap. Cap oval, brown, with center light.

First Nymphal Stage.—Length 1.34 mm. Width of head includ-

ing eyes 0.51 mm. Color white. Broadest across the head. Sides of thorax subparallel, slightly widest in front. Basal segments of abdomen slightly broader than posterior portion of thorax and gradually rounding to its posterior end. Antennæ from one-third to one-half the length of the body, apical third dark. Eyes prominent consisting of numerous ommatidia. Head broadly rounded in front, slightly sinuate just before eyes, front and vertex sparsely covered with fine hair. Thorax one and one-half times the length of the head, segments of equal length, each segment slightly broader at posterior than at anterior end. Abdomen varying in length, about one and one-third the length of the thorax. Dorsal surface of body bearing a number of fine hairs. Hairs on abdomen are arranged in longitudinal rows, four dorsal and two lateral. Legs white, bearing a number of fine hairs. Rostrum extending to metathorax.

Second Nymphal Stage.—Length 1.6 mm. Width of head including eyes 0.7 mm. Somewhat similar to preceding stage. Antennæ shorter, head shorter. Thorax twice as long as head. Thoracic segments subequal. Sides of meso- and metathorax slightly extended posteriorly. Abdomen twice as long as thorax. Hairs on body more pronounced. A few specimens show two longitudinal light brown dorsal bands extending from head to apex of abdomen and equal in width to light band between them.

Third Nymphal Stage.—Length 2.5 mm. Width of head including eyes 0.9 mm. Somewhat similar to preceding stage. Antennæ shorter, head somewhat shorter and more transverse. Posterior extension of meso- and metathoracic segments more pronounced. Most forms of this stage appear to show some markings varying from traces of light bands on thorax to well-defined dark bands extending from head to apex of abdomen with vertex and portion of front of head, portions of legs and some median spots on ventral surface of apical abdominal segments dark.

Fourth Nymphal Stage.—Length 3.5 mm. Width of head including eyes 1.2 mm. Head including eyes slightly broader than thorax. Sides of thorax parallel. Abdomen gradually tapering toward tip. Antennæ short, about one-half width of head. Head convex, four times as broad as long, anterior and posterior margins parallel, front and vertex finely pubescent. Prothorax at middle one and one-half times length of head. Mesothorax slightly longer and

metathorax one-half as long as prothorax at middle. Wing pads of meso- and metathorax extending beyond anterior margin of third abdominal segment. Rostrum extending to between second pair of legs. Sexes distinguishable in this stage. Hairs of legs more pronounced. Markings of dark forms similar to those of preceding stage.

Fifth Nymphal Stage.—Length 4.6 mm. Width of head including eyes 1.5 mm. Shape somewhat similar to that of fourth stage, more elongate. Dark markings less pronounced, except dark band on vertex of head. Antennæ one-half width of head. Head similar to that of preceding stage, more or less slightly sinuate in front. Front and vertex finely pubescent. Pronotum at middle one and one-half times the length of the head, transversely grooved on posterior dorsal surface. Mesonotum extending posteriorly at middle where it is broadly rounded, somewhat longer than pronotum. Metanotum one-half length of pronotum. Wing pads of meso- and metathorax extending to third abdominal segment. Rostrum similar to that of fourth stage. Hairs on body more pronounced than in preceding stage.

RECORDS AND DESCRIPTIONS OF NEOTROPICAL CRANE-FLIES (TIPULIDÆ, DIPTERA). I.

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During the past few years a number of collections of crane-flies from various localities in South and Central America have been available for study. Some of the more interesting new species are discussed in the present article. In addition, the records of a few species whose known range is greatly extended are also given, most of them being South American forms that are now admitted to the North American Fauna for the first time.

The collections studied in this paper are as follows:

ARGENTINA, a small lot from Catamarca, through the kindness of Señor Pedro Jorgensen-Hansen.

COLOMBIA, a small collection from the Santa Marta region, taken